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EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

07/01/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,004	Applicant(s) UEHARA ET AL.	
	Examiner Keath T. Chen	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 and 28-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The claim amendment filed on 06/05/2008, addressing rejection of claims 1-12 and 27 from the non-final office action (03/05/2008), by amending claims 1, 4, 11, and 27, is acknowledged and will be addressed below.

Election/Restrictions

1. Claims 13-26 and 28-36 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention II and IB, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/25/2007.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-6, 11-12, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrin et al. (US 6281469, hereafter '469), in view of Okui (English translation of JP 2000109979, hereafter '979).

'469 teaches some limitations of:

Claim 1: A plasma processing apparatus (col. 2, lines 29-34) for plasmatizing a processing gas in a discharge space under a pressure in the vicinity of atmospheric pressure (the apparatus is capable of, by turning off vacuum pump, "under a pressure in the vicinity of atmospheric pressure" is considered as intended use) and jetting the plasmatized gas (col. 10, lines 64-66) so as to be contacted to a workpiece (col. 1, lines

29-31) to be processed, apparatus comprising: a first electrode row including a plurality of electrode members (Fig. 15, row #12A); a second electrode row (Fig. 15, row #12B) including another plurality of electrode members and arranged in a line parallel with said first electrode row; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially same positions in the extending direction, having opposite polarities and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space(col. 9, lines 1-4), one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground); a row-to-row gap including said row-to-row partial gap formed between said first and second electrode rows, an introduction port (Fig. 20, #28) of the processing gas communicated with a side in a flowing direction (vertical direction in Fig. 20) orthogonal to the extending and short directions of said row-to-row gap (horizontal and perpendicular direction in Fig. 20), a jet port (Fig. 20, #23) communicated with a side opposite to the introduction port of said row-to-row gap (jet port is opposite to the introduction port).

Claim 2: those of said electrode members constituting said electric field applying pole being connected to different power sources, respectively (col. 6, lines 56-58).

Claim 3: only those of said electrode members constituting said electric field applying pole being connected to a common power source (col. 6, lines 56-58).

Claim 4 (besides claim 1): two of said electrode members of each of said electrode rows arranged adjacent to each other in said extending direction being opposite in polarity with respect to each other (as shown in Fig. 15).

Claim 5: an in-row gap is formed (Fig. 15, the vertical gaps) between two of said electrode members arranged adjacent to each other in said extending direction in said first electrode row and/or said second electrode row, said in-row gap also forming a part of said discharge space.

Claim 6: one of said two electrode members includes a first surface (Fig. 15, top line of the first electrode of row #12B, facing #12A) forming said row-to-row gap and a second surface (the face that facing right) disposed at an angle (right angle) with respect to said first surface, and the other of said two electrode members (the second electrode of row #12B, grid patterned) includes a third surface (the face facing #12A) generally flush with said first surface and forming said row-to-row gap and a fourth surface (the face facing left) placed opposite to said second surface and arranged at an angle (straight angle) with respect to said third surface, said in-row gap being formed between said second surface and said fourth surface.

Claim 11 (besides claim 1): two of said electrode members of each of said electrode rows arranged adjacent to each other in said extending direction being same in polarity with respect to each other (col. 6, lines 8-11, periodicity can be omitted if desired).

Claim 12: said polarities include an electric field applying pole and a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground), and an

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insulating partition wall (#24, spacer, Fig. 20, an enlarged view of Fig. 9) is interposed between two of said electrode members having said electric field applying pole which are adjacent to each other in said extending arranging direction.

Claim 27: A plasma processing apparatus for introducing a processing gas into a discharge space under a pressure in the vicinity of atmospheric pressure (the apparatus is capable of, by turning off vacuum pump) from an introduction port (Fig. 20, #28), plasmatizing the gas in said discharge space and jetting the plasmatized gas through a jet port (#23) so as to be contacted to a workpiece to be processed, said apparatus comprising: a first electrode row including a plurality of electrode members intersecting with a flowing direction toward said jet port from said introduction port (vertical direction in Fig. 20), a second electrode row including another plurality of electrode members arranged in a line parallel with said first electrode row; one of said electrode members of said first electrode row; one of said electrode members of said second electrode rows, which are arranged at a first position in said extending direction, having opposite polarities (grounding pole is an opposite polarity, as defined at the later part of this claim) and forming a first row-to-row partial gap therebetween, said first row-to-row partial gap serving as a part of said discharge space, and another of said electrode members of said first electrode row and another of said electrode members of said second electrode rows, which are arranged at a second position adjacent to said first position, having opposite polarities with each other and forming a second row-to-row partial gap herebetween, said second row-to-row partial gap serving as another part of said discharge space, said electrode member which is arranged at the first position in

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said first electrode row and said electrode member which is arranged at the second position in said first electrode row having opposite polarities each other and forming an in-row gap therebetween, one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (above 20 lines substantially the same as discussed in claims 1 and 4 rejection above); an introduction part (#27 and #28, together) having said introduction port (#28) that includes a row-to-row introduction port (one of the opening facing a gap) disposed astride said first row-to-row partial gap and said second row-to-row partial gap (viewing from Fig. 15, a horizontal line) and an in-row introduction port directly connected to said in-row gap (#27 distribute gas to both row-to-row gas and in-row gap, see Fig. 15 as top view of Fig. 20).

'469 does not explicitly teach the limitations of:

Claims 1, 4, and 11: (the first electrode rows ... members) each being elongate in an extending direction and short in a short direction orthogonal to the extending direction arranged in a line in the extending direction; (the second electrode rows ... members) each being elongate in the extending direction and short in a short direction; and a conveyor that relatively passes said workpiece through outside of said discharge space under said pressure in the vicinity of atmospheric pressure in a direction intersecting with the extending and flowing directions during the jetting of the plasmatized gas.

Claim 27: (the first electrode rows ... members) each being elongate in an extending direction and short in a short direction orthogonal to the extending direction

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arranged in a line in the extending direction, the extending and short directions being intersecting with a flowing direction toward said jet port from said introduction port; (the second electrode rows ... members) each being elongate in the extending direction and short in a short direction; and a conveyor that relatively passes said workpiece through outside of said discharge space under said pressure in the vicinity of atmospheric pressure in a direction intersecting with the extending and flowing directions during the jetting of the plasmatized gas.

'469 further teaches that the need for plasma processing of large surface workpeices (col. 2, lines 1-2) and the electrode members being elongate in an extending direction arranged in a line in the extending direction (Fig. 7) from a different view direction.

'979 is an analogous art in the field of plasma surface treatment (field of the invention), particularly in providing large area processing ([0004], line 2) for the purpose to achieve uniformity ([0004], line 4). '979 teaches an electrode array (#1, Fig. 3) depositing on substrate (#3-1) over a conveyor (R) while gas is discharged in the vertical direction (Fig. 2a).

'469 discloses the claimed invention except for the shape of electrode member being square instead of rectangular. It would have been an obvious matter of design choice to alter the shape of electrode members, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally

recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 1966.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '979 with '469. Specifically, to have replaced the stationary substrate (for example, Fig. 21) with a conveyor as taught in Fig. 3 of '979 and to have changed the shape of the electrode to rectangular, using Fig. 7 as a guide to arrange electrode in an extending direction, for the purpose of achieving continuous coating and uniformity ('979, [0004] line 4), with a reasonable expectation of success.

The examiner takes official notice that it is a common knowledge to arrange electrode (or other objects) in the length-wise direction for the purpose to extend the electrode (or objects).

3. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over '469 and '979, further in view of Koga et al. (US 6518990, hereafter '990).

'469 and '979, together, teach all limitations of claim 6, as discussed above. '469 seeks sub-electrode arrangement (abstract) and teaches various configurations of two-dimensional electrode arrays, including triangular arrays where the in-row gap is at non right-angle to row-to-row surface (Fig. 15-17, col. 9, lines 7-9) are suitable.

'469 does not teach the limitations of:

Claim 7: said first surface and second surface form an obtuse angle and said third surface and fourth surface form an acute angle, said in-row gap being in a slantwise relation with said row-to-row gap.

Claim 9: said electrode row on the opposite side of said electrode row having said first surface, said electrode member located in the substantially same position as said electrode member having said first surface is arranged astride said first surface and the end face of said third surface.

'990 is an analogous art in the field of apparatus which utilizes plurality of electrodes to form charge on the substrate (abstract, Fig. 5), particularly in providing various electrode array arrangement (summary of the invention, col. 3, lines 8-44) for the purpose to achieve uniformity (col. 4, lines 19-26, '469, col. 13, lines 2-4). '990 provides a trapezoid electrode array (Fig. 16) having stable application of charge. Such trapezoid electrode array met the limitation of claim 7 and 9.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '990 with '469. Specifically, to have incorporated the electrode array arranged as taught in Fig. 16 of '990 into the electrode array of Fig. 15-17 of '469, for the purpose of achieving uniformity and stable application, with a reasonable expectation of success.

Further, '469 discloses the claimed invention except for the shape of the electrode. It would have been an obvious matter of design choice to have altered the shape of electrode from the various shapes already disclosed in '469, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

For claim 8, '469 further teaches the rounding of electrode surface (for example, Fig. 12).

'990 further teaches the limitation of claim 8:

Corners on the side of the obtuse angle formed between said first surface and second surface are R-chamfered with a relatively large radius of curvature, while corners on the side of the acute angle formed between said third surface and fourth surface are R-chamfered with a relatively small radius of curvature (col. 4, lines 48-56).

The rounding of corners has two possible results: one corner having a larger radius or a smaller radius than the other corner. '469 discloses the claimed invention except for rounding of corner. It would have been an obvious matter of design choice to vary the shape of corners, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

'469 also teaches the limitation of claim 10:

The downstream end of said in-row gap is open in such a manner as to be able to jet a processing gas therefrom and without passing the processing gas through said row-to-row gap (Figs. 18-20 show the jetting portion is more open than the gas introduction port, therefore, processing gas formed in the in-row gap can flow downward directly).

Response to Arguments

Applicant's arguments filed on 06/05/2008 have been fully considered but they are not persuasive:

4. Applicant's amendment of claims 1, 4, 11, and 27 overcome the 35 USC 112, 2nd paragraph rejection.

5. In regarding to 35 USC 103(a) rejection of claims 1-6, 11-12, and 27 based on Perrin ('469) and Okui ('979), see pages 17-20, Applicant's arguments are:

a. Modifying '469 to incorporate the conveyor of '979 would change the principle of operation of '469, see the last paragraph of page 18. The principle of operation is the reaction volume to result in an "average" effect on the workpiece, see line 3 of page 18.

b. Even '469 and '979 could be modified to use such a conveyance system, ... there is no basis for ... "one of said electrode ... being a grounding pole", see the first paragraph of page 19.

c. '469 fail to disclose "a first electrode row including a plurality of electrode members each being elongate in an extending direction and short in a short direction orthogonal to the extending direction and arranged in a line in the extending direction" and "an introduction port of the processing gas communicated with a side in a flowing direction orthogonal to the extending and short directions", see the third paragraph of page 19. Furthermore, Applicants challenge the official notice as improper, see the last paragraph of page 20, by citing a section of MPEP 2144.03.

These arguments are not found persuasive. In response to Applicant's arguments,

- a. The use of conveyor system can hardly adversely affect the "averaged" effect of the reaction volume, as the average effect is a result of distance between the substrate and the electrode (PG in Fig. 7) being order larger than the distance between two sub-electrodes (between #12A and 12B in Fig. 15). By employing a conveyor system does not change the distance. Furthermore, the RF frequency of 13.56 MHz (col. 13, line 10) is very fast relative to the moving speed of conveyor system. For example, assuming each electrode is 10 cm, then the moving speed of conveyor has to be in the order $10 \text{ cm} * 13.56 \times 10^6 \text{ (/sec)} = 1356 \text{ Km/second}$ to affect the "averaged" effect.
- b. Applicant fails to specifically point out exactly why '469 fail to meet the limitation of "one of said electrode ... being a grounding pole". The examiner maintains this limitation is met as presented on lines 1-7 of page 4 of the non-final office action (03/05/2008), for example, from col. 9, lines 1-4 and col. 6, lines 50-55 of '469.
- c. To clarify the record, Applicants' response filed on 02/14/2008: "Applicants submit one of ordinary skill in the art would not modify the shape of the sub-electrode 12 into irregular polygonal shape, e.g. rectangular, because such a modification is not merely a change in shape" (lines 11-14 of page 19, 02/14/2008), to support that "the combination of 'elongated' and 'arranged in a line' in the extending direction is not obvious." (lines 5-7 of page 19, 02/14/2008).

The examiner refuted these statements by first citing rectangular shape electrode is obvious and then made official notice that arrangement of the rectangular shape electrode in the length-wise/extending direction is a common knowledge (page 8 of the non-final action, 03/05/2008).

For the obviousness of rectangular electrode, the examiner stated "Perrin does teach 'elongate' and 'arranged in a line' in the extending direction, as shown in Fig. 7" in the non-office action (page 12). Applicants further pointed out Fig. 14 also teaches an elongated electrode, see the second paragraph of page 20.

It seems Applicants are arguing that neither Fig. 7, see the first paragraph of page 20, nor Fig. 14, see the second paragraph of page 20, does not teach other limitations of claim 1.

In response to applicant's arguments against the references (Fig. 7 of '469) individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The examiner is using Fig. 7 of '469 is 35 USC 103 analysis, see the third paragraph of page 8 in the non-final action, (03/05/2008), particularly in supporting that rectangular shape electrode is obvious.

In regarding official notice, the examiner maintains that "it is a common knowledge to arrange electrode (or other objects) in the length-wise direction for

the purpose to extend the electrode (or objects)". '469 teaches the need of processing of large surface workpieces (col. 2, lines 1-2). Given rectangular shape electrodes, it is a common knowledge to arrange these rectangular electrodes length-wise/extending direction in order to process large surface workpieces ('469, col. 2, lines 1-2); as opposed to arrange these rectangular electrodes width-wise/short direction which would need many more electrodes to achieve the same large surface.

The examiner is aware of MPEP 2144.03(B) and maintains the criteria of MPEP 2144.03 (B) is followed, specifically, the "specific factual findings predicated on sound technical and scientific reasoning to support ... conclusion" is met. In addition, MPEP 2144.03 (A) states "it might not be unreasonable for the examiner in a first Office action to take official notice of facts by asserting that certain limitations in a dependent claim are old and well known expedients in the art without the support of documentary evidence provided the facts so noticed are of notorious character and serve only to 'fill in the gaps' which might exist in the evidentiary showing made by the examiner to support a particular ground of rejection. In re Zurko, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001); Ahlert, 424 F.2d at 1092, 165 USPQ at 421".

In addition, applicants did not specifically point out the supposed errors in the examiner's action, as required by MPEP 2144.03 (C), "To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact

is not considered to be common knowledge or well-known in the art". Applicants fail to point out why it is not well-known in the art to arrange rectangular electrodes in the length-wise/extending direction to achieve a large surface; or provides a counter example.

The above official notice is, hereafter, considered admitted prior art. See MPEP 2144.03 (C).

6. In regarding to 35 103(a) rejection of claims 7-10 based on '469, '979, and Koga ('990), see bottom of page 21, Applicants argument is that '990's electrode functions differently than the plasma electrode.

The above argument is found not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that '990 is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, '469 is seeking sub-electrode arrangement (abstract) while '990 provides an alternative for the sub-electrode arrangement.

Furthermore, it has been held that changes in shape is prima facie obvious, see MPEP 2144.04 B. The examiner notices that Applicants did not respond to this prima facie obviousness (first paragraph of page 10 in the office action, 03/05/2008):

'469 discloses the claimed invention except for the shape of the electrode. It would have been an obvious matter of design choice to have altered the shape of electrode from the various shapes already disclosed in '469, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

In the absence of persuasive evidence that the particular configuration of the claimed electrode, the examiner considers claims 7-10 obvious variants of the parent claim.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/K. T. C./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792